

Design Technology Progression of Skills: Structures and Mechanisms

<u>DT Skill</u>	<u>EYFS</u>	<u>Year One</u>	<u>Year Two</u>	<u>Year Three</u>	<u>Year Four</u>	<u>Year Five</u>	<u>Year Six</u>
<u>Design</u>	• Make verbal plans and material choices. • Develop a junk model.	• Design a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. • Create clearly labelled drawings that illustrate movement.	• Create a class design criteria for a moving monster. • Design a moving monster for a specific audience in accordance with a design criteria.	• Design a toy which uses a pneumatic system. • Develop design criteria from a design brief. • Generate ideas using thumbnail sketches and exploded diagrams. • Learn that different types of drawings are used in design to explain ideas clearly.	• Design a stable pavilion structure that is aesthetically pleasing and select materials to create a desired effect. • Build frame structures designed to support weight.	• Design with a broader range of ideas and deeper innovation, to think critically about their ideas' practicality and originality. • Begin to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design.	
<u>Make</u>	• Improve fine motor/scissor skills with a variety of materials. • Join materials in a variety of ways (temporary and permanent). • Join different materials together. • Describe their junk model, and how they intend to put it together.	• Adapting mechanisms, when: - they do not work as they should. - to fit their vehicle design. - to improve how they work after testing their vehicle.	• Make linkages using card for levers and split pins for pivots. • Experiment with linkages adjusting the widths, lengths and thicknesses of card used. • Cut and assemble components neatly.	• Create a pneumatic system to create a desired motion. • Build secure housing for a pneumatic system. • Use syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy.	• Create a range of different shaped frame structures. • Make a variety of free-standing frame structures of different shapes and sizes. • Select appropriate materials to build a strong structure and cladding.	• Produce lists of equipment, materials and tools that they need for a task. • Select materials, components or ingredients based on research or user needs. • Explain their choices, referring to their research.	

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				• Select materials due to their functional and aesthetic characteristics. • Manipulate materials to create different effects by cutting, creasing, folding and weaving.	• Reinforce corners to strengthen a structure. • Create a design in accordance with a plan. • Learn to create different textural effects with materials.	• Consider which equipment will work well together • Assess risks associated with different tools and equipment. • Cut jelutong or other harder wood with a coping saw or a tenon saw in small groups. • Cut in a back-and-forth sawing motion where appropriate. • In supervised groups, use hot glue guns safely. • Recognise that hot glue is useful for joining materials that need a strong bond that sets quickly.	
<u>Evaluate</u>	• Give a verbal evaluation of their own and others' junk models with adult support. • Check to see if their model matches their plan.	• Test wheel and axle mechanisms, identifying what stops the wheels from turning, and recognise that a wheel needs an	• Evaluate own designs against design criteria. • Use peer feedback to modify a final design.	• Use the views of others to improve designs. • Test and modify the outcome, suggesting improvements. • Understand the purpose of exploded-	• Evaluate structures made by the class. • Describe what characteristics of a design and construction	• Assess their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience,	

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	• Consider what they would do differently if they were to do it again. • Make simple suggestions to fix their junk model. • Describe their favourite and least favourite part of their model.	axle in order to move.		diagrams through the eyes of a designer and their client.	made it the most effective. • Consider effective and ineffective designs.	sustainability and cost. • Provide feedback that is helpful, specific and encouraging. • Incorporate feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.	
<u>Knowledge</u>	• To know there are a range of different materials that can be used to make a model and that they are all slightly different.	• To know that wheels need to be round to rotate and move. • To understand that for a wheel to move it must be attached to a rotating axle. • To know that an axle moves within an axle holder which is fixed to the vehicle or toy. • To know that the frame of a vehicle (chassis) needs to be balanced.	• To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. • To know that there is always an input and output in a mechanism. • To know that an input is the energy that is used to start something working.	• To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air. • To understand how sketches, drawings and diagrams can be used to communicate design ideas.	• To understand what a frame structure is. • To know that a 'free-standing' structure is one which can stand on its own. • To know that a shelter is a structure to keep us dry and give us shelter. • To know that different materials can be applied to structures for	• To know which mechanisms are working together to make a mechanical system. • To know that there are different directions of movement. • To know that mechanisms can change one type of movement to another.	

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